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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,764	09/27/2005	Alexander Dardin	278069US0PCT	1825

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ALEXANDRIA, VA 22314		

EXAMINER	
VASISTH, VISHAL V	

ART UNIT	PAPER NUMBER
1797	

NOTIFICATION DATE	DELIVERY MODE
05/11/2010	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/550,764	<b>Applicant(s)</b> DARDIN ET AL.	
	<b>Examiner</b> VISHAL VASISTH	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicants' response filed on 2/24/2010 amended independent claim 1. Applicants' amendment overcomes the 35 USC 103 rejection over Mishra from the office action mailed on 11/6/2009 and therefore this rejection is withdrawn. Applicants' amendments and arguments addressed below do not overcome the 35 USC 103 rejection over Mishra in view of Pappas which is now applied to claims 1-12 below. New grounds of rejection necessitated by the amendment are set forth below.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

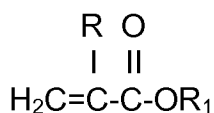
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

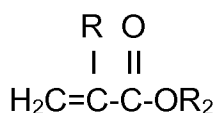
4. Claims 1-14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mishra et al. US Patent No. 5,834,408 (hereinafter referred to as Mishra) in view of Pappas et al., US Patent No. 3,816,314 (hereinafter referred to as Pappas).

Mishra discloses a lubricating oil composition for use in gear oil, hydraulic fluids and motor oils (as recited in claim 17) (Col. 4/L. 55-65) comprising lube oil basestock (a base oil as recited in claim 1) (Col. 5/L. 29-32) and a copolymer additive comprising 0 to 60 wt% of an acrylic monomer (a) of the formula:



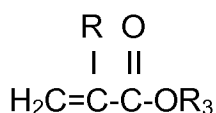
wherein R is hydrogen or methyl, and R<sub>1</sub> is an alkyl group having from 1 to 5 carbon atoms (within the range of carbons as recited in formula (I) of claim 1) (Col. 2/L. 25-30).

Mishra further discloses polymerization of the above monomer with 0 to 60 wt% of an acrylic monomer (b) of the formula:



wherein R is hydrogen or methyl, and R<sub>2</sub> is an alkyl group having from 6 to 14 carbon atoms such as 2-ethylhexyl methacrylate (within the range of carbons as recited in formula (II) of claim 1) (Col. 2/L. 34-40 and Col. 2/L. 63-65).

Mishra also discloses polymerization of the above monomers with 15 to 80 wt% of an acrylic monomer (c) of the formula:



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wherein R is hydrogen or methyl, and R<sub>3</sub> is an alkyl group having from 15 to 22 carbon atoms (within the range of carbons as recited in formula (II) of claim 1) (Col. 2/L. 43-50).

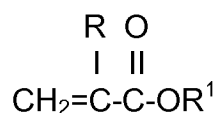
The process of Mishra in polymerizing the above mentioned monomers allows for a wide range of copolymers including block copolymers (as recited in claims 1 and 8-9) (Col. 4/L. 9-16 and Col. 4/L. 31-37).

Mishra further discloses monomers that provide further improvements to the performance of the copolymer properties such as dispersancy, antioxidancy and antiwear may also be included in the copolymers of the present invention. Typical performance enhancing monomers of this class include N,N-dimethylamino propyl methacrylamide and N,N-diethylamino propyl methacrylamide (read on formula (III) and claims 2-7) (Col. 3/L. 27-39). The block copolymer of Pappas, can be used in lubricating oils in amounts from about 0.001 to 1 wt% based on the total weight of the oil (within the range as recited in claim 14) (Col. 5/L. 6-12).

Mishra also discloses additional additives to formulate the finished composition including viscosity index improvers, antioxidants and corrosion inhibitors (as recited in claim 13) (Col. 4-5/L. 66-5).

Mishra discloses monomer with hydrophobic segments and monomers with polar segments. Mishra does not, however, disclose a concentration range for the monomers with polar segments and therefore Mishra does not disclose the lengths of the polar segments or a weight ratio between the two segments. Mishra also does not explicitly disclose weight average degree of polymerization of the hydrophobic or polar segments.

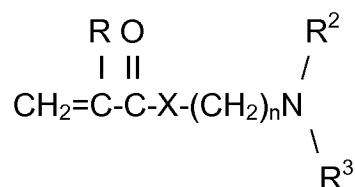
Pappas discloses block copolymers comprising an oil-soluble (hydrophobic) segment and a polar segment (see Abstract). The block copolymer is prepared by block polymerization of a first acrylic comonomer A, and a second nitrogen-containing comonomer B (Col. 3/L. 5-10). Comonomer A is selected from acrylates having the formula:



wherein R is hydrogen or a C<sub>1</sub> to C<sub>4</sub> alkyl group and R<sup>1</sup> is a C<sub>8</sub> to C<sub>22</sub> alkyl group.

Comonomer A overlaps with Formula (II) of claim 1 R of comonomer A is hydrogen and so are R<sup>5</sup> and R<sup>6</sup> in formula (II) of claim 1 and R<sup>4</sup> is an alkyl radical having from 6 to 30 carbon atoms (which overlaps with R<sup>1</sup> is a C<sub>8</sub> to C<sub>22</sub> alkyl group).

Comonomer B is selected from a group of nitrogen-containing monomers, preferably from acrylic compounds having the formula:



wherein R is as above, X is oxygen or an –NR– group, n is a whole number from 2 to 5, and R<sup>2</sup> and R<sup>3</sup> are each C<sub>1</sub> to C<sub>12</sub> alkyl group (Col. 3/L. 36-51).

The block polymers of Pappas comprise from about 99.75 to about 90 mole percent of comonomer A units and from about 0.25 to about 10 mole percent of comonomer B, preferably having a molar ratio of A to B between 99:1 to 95:5. Based on the molar ratio and on the molecular weight of an example of comonomer A (2-

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ethylhexyl methacrylate) being about 198 g/mol and the molecular weight of an example of comonomer B (diethylaminopropyl methacrylamide) being about 200 g/mol, there are overlapping ranges for components (b) of claim 1 with comonomer A (from 50 to 100 wt%) and the polar segment of claim 1 with comonomer B. Furthermore, Pappas discloses in column 5, lines 20-33 that a block copolymer comprising 5 wt% of comonomer B would actually need 12.5 moles of comonomer B because only a part of comonomer B enters the block copolymer. Based on this number of moles per weight percentage the length of the hydrophobic to polar comonomers would overlap and encompass the range as recited in claim 1. Examiner is also of the position that the length range recited in claim 1 is a result effective variable and that a discovery of optimum value of result effective variable in known process is ordinarily within the skill in the art and would have been obvious, consult *In re Boesch and Slaney* (205 USPQ 215 (CCPA 1980)).

The block copolymers of Pappas can be used in lubricating oils (base oil as recited in claim 1), wherein the block copolymer have dispersant regions absorb sludge thereby reducing friction (Col. 5/L. 34-45).

Comonomers A (polar segment D as recited in claim 11) and comonomer B (hydrophobic segment P as recited in claim 10) have an average number of monomeric units in the polymer from about 100 to 3,000 (Col. 4/L. 21-33). Based on the disclosed degree of polymerization and the molecular weight for comonomers A and B as discussed above there is an overlap between the ranges recited and the weight-average degree of polymerization in Pappas. It would have been obvious to one of

ordinary skill in the art at the time of the invention to use the length and weight ratio of hydrophobic to polar segments with the designated weight average degree of polymerization in order to achieve a desired molecular weight of the copolymer resulting in sought after physical properties.

***Claim Rejections - 35 USC § 103***

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mishra in view of Pappas as applied to claims 1-14 and 17 above, and further in view of Nesvadba et al., US patent Application Publication No. 2004/0242813 (hereinafter referred to as Nesvadba).

Mishra/Pappas disclose all of the limitations discussed above, and Mishra further discloses polymerizing the monomers via anionic polymerization via the use of initiators and catalysts that are present in inert environments wherein the temperature useful in producing the copolymers is between -78°C and about 30°C. Mishra/Pappas, however, do not disclose polymerization by means of initiators which have a transferable atom group and one or more catalysts having a transition metal in the presence of ligands.

Nesvadba discloses a process for preparing polymers by anionic controlled radical polymerization in the presence of an initiator with a transferable atom group and a transition metal complex catalyst which is complexed and counterbalanced by anionic ligands in an inert solvent thereby forming two segments (Claim 1 of Nesvadba and Para. [0161]-[0162]). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the process for preparing polymers disclosed in Nesvadba



in preparing the polymers of Mishra/Pappas in order to ensure that the polymers have narrow polydispersity and controlled physical properties (Para. [0001] of Nesvadba).

***Claim Rejections - 35 USC § 103***

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mishra in view of Pappas as applied to claims 1-14 and 17 above, and further in view of Benicewicz et al., US Patent Application Publication No. 2003/0060577 (hereinafter referred to as Benicewicz).

Mishra/Pappas disclose all of the limitations discussed above, and Mishra further discloses polymerizing the monomers via anionic polymerization via the use of initiators and catalysts that are present in inert environments wherein the molecular weight distribution is controlled. Mishra/Pappas, however, do not explicitly disclose polymerizing monomer compositions in a lubricant oil in the presence of dithiocarboxylic ester.

Benicewicz discloses a free radical polymerization process comprising combining at least one monomer polymerizable by free radicals and at least one transition metal superoxide and a molecular weight controlling agent such as dithiocarboxylic ester (Para. [0007]). It would have been obvious to one of ordinary skill in the art at the time of the invention to use dithiocarboxylic ester in the composition of Mishra/Pappas in order to control the molecular weight of the polymer.

***Response to Arguments***

7. Applicants' arguments filed on 2/4/2010 with respect to claims 1-17 have been considered and are not persuasive.

Applicants argue that the present invention provides unexpected results and provide data that allegedly supports the applicants' position. The data submitted, however, is not commensurate with the scope of the claims. For example, claim 1 gives no concentration ranges for the base oil or the additive having friction-modifying properties. The data from the instant specification, however, is very specific in terms of concentration of base oil and additive.

Also, claim 1 recites very broad ranges of monomer concentration that make up the friction modifying additive. The instant specification, however, uses very narrow ranges for monomers and repeating units and further has embodiments that include the monomer segments of formulae (III) which is merely an optional component as written in instant claim 1. Furthermore, the R groups in formulae (I), (II) and (III) are much broader than the specific acrylates and compounds recited in the instant specification. The criticality for the ranges of R groups needs to be shown in order for there to be unexpected results for all compounds that are represented by formulae (I), (II) and (III).

In order to show unexpected results applicants need to further compare their example oils to the closest prior art in order to show that the block copolymers of their invention are unexpected in light of the block copolymers disclosed in Mishra. Applicants point to Figures 2-5 which demonstrates the superiority of the example copolymers versus a random copolymer of the same composition. The random

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copolymer, however, is not emblematic of the closest prior art. For these reasons applicants have not demonstrated unexpected results across the scope of the claims.

### ***Conclusion***

8. Applicants' amendment necessitated the new ground(s) of rejection presented in this office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VISHAL VASISTH whose telephone number is (571)270-3716. The examiner can normally be reached on M-R 8:30a-5:30p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571)272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VVV

/Ellen M McAvoy/  
Primary Examiner, Art Unit 1797